DOCUMENT RESUME

ED 093 603 SE 017 014

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TITLE An Approach to the Study of Far Western North American Prehistory: Early Man.
INSTITUTION Oregon Univ., Eugene. Museum of Natural History.
PUB DATE Aug 73
NOTE 17p.; Bulletin No. 20
AVAILABLE FROM University of Oregon, Museum of Natural History, Eugene, Oregon 97403 ($0.75)

EDRS PRICE MF-$0.75 HC-$1.50 PLUS POSTAGE
DESCRIPTORS Ancient History; *Anthropology; Archaeology; Bulletins; Geology; Instruction; Instructional Materials; Science Education
IDENTIFIERS Natural History

ABSTRACT

This bulletin, in keeping with the basic purpose of all the bulletins published by the Museum of Natural History of Oregon, contains the text of a lecture presented in the field of anthropology. The approach taken is interdisciplinary. Drawn together are not only published works, but also the skills and wisdom of scholars in the peripheral disciplines on which archaeology so greatly relies. Cressman's approach deals with the so-called Early Man record, using artifacts as a means to an end and not an end in themselves. He presents a consideration of the origins of the New World population considering first the question of indigenous origin. This he rules out and then presents in detail the facts that support that the population was derived from another continent, namely, northeastern Asia. Evidence is presented from geological data, and the archaeological evidence is presented in detail. A list of publications of the Museum of Natural History at the University of Oregon is included. (EB)

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AN APPROACH TO THE STUDY OF FAR WESTERN NORTH AMERICAN PREHISTORY: EARLY MAN

Luther S. Cressman

BULLETIN No. 20
of the
MUSEUM OF
NATURAL HISTORY
University of Oregon
Eugene, Oregon
August 1973

We archaeologis renely limited view the life of the p tifacts we recover. do not know their alidated their value tems nor the tales by which their imaginative life given play in fantasy. We should not substitute limited knowledge for their reality. That there was more to their lives than just the struggle to survive is shown by the care men lavished on weapons, women on basketry, the humolest of household goods, and the ceremonial objects which they made. I, as other archaeologists, have excavated weapons which could only have been made for their elegant finish to delight the beholder. The artistry lavished by the maker did not increase the functional capacity of the weapon. And I have dug from the dirt and filth of caves fragments of exsite basketry which gave pleasure because of the ll with which the orig were made and the deration applied. Simple, woven, undecorated baskets

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The *Bulletin* of the Museum of Natural History of the University of Oregon is published to increase the knowledge and understanding of the natural history of Oregon. Original articles in the fields of Archaeology, Botany, Ethnology, Geology, Paleontology, and Zoology appear irregularly in consecutively numbered issues. Contributions arise primarily from the research programs and collections of the Museum of Natural History and the Oregon State Museum of Anthropology. However, in keeping with the basic purpose of the publication, contributions are not restricted to these sources and are both technical and popular in character.

DAVID L. COLE, *Acting Director*
LAURENCE R. KITTLEMAN, *Editor*
Museum of Natural History
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by

LUTHER S. CRESSMAN

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August 1973

FOREWORD

Luther S. Cressman, Professor Emeritus of Anthropology in the University of Oregon, presented the paper published here before an audience in the Department of Anthropology on February 22, 1973. Dr. Cressman had accepted an invitation to speak, not knowing that the intention was to create an occasion on which he could be presented with a *Festschrift** in his honor. The presentation was made by Homer G. Barnett, a colleague of Dr. Cressman's in the Department of Anthropology since 1939.

Professor Cressman's lecture, *An Approach to the Study of Far Western North American Prehistory: Early Man*, exemplifies his approach to archaeology that is familiar to all who have worked with him. The text of the lecture is published here to share it with a wider audience. Dr. Cressman's approach has always been interdisciplinary—the effective use, synthesis, and integration of all evidence and of the full resources of the university system. He draws together not only the published works, but also the skills and wisdom of scholars in the peripheral disciplines on which archaeology so greatly relies. It is this approach, now widely accepted, that is perhaps Dr. Cressman's greatest contribution to his chosen field.

DAVID L. COLE
Eugene, Oregon
March 28, 1973

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* For the Chief: Essays in Honor of Luther S. Cressman, *University of Oregon Anthropological Papers*, No. 4, 1973, edited by Fred W. Voget and Robert L. Stephenson, with a foreword by Theodore Stern.

AN APPROACH TO THE STUDY OF FAR WESTERN NORTH AMERICAN PREHISTORY: EARLY MAN[1]

by

LUTHER S. CRESSMAN
Professor Emeritus of Anthropology
University of Oregon

Human prehistory of the New World began at some uncertain time in the Pleistocene when the first human set foot on the land which is now Alaska. Unlike Columbus, he did not know that he had discovered a New World for, to him, it was simply an extension of the land he already knew. Hopkins put it felicitously when he wrote: ". . . and found—quite unwittingly—a new world to conquer."

The environment of Far Western North America, that is west of the Rocky Mountains, is uniquely different from that of the rest of the continent. A comment by Dwight Taylor is apt: ". . . the Great Basin and central west-coast region of North America, where the Middle Pleistocene orogeny of the Coast Ranges, eustatic changes of sea level, block faulting in the Great Basin, Pleistocene desiccation, and volcanism have changed habitats more rapidly and drastically than in other parts of North America."[2] It was to this diverse and changing environment that these early men and women had to adapt or perish; and because of the diverse character of the environments and the differential change through time the prehistory of this segment of the continent is highly complex and distinctive.

Archaeologists use the expression, Early Man Period, for the segment of prehistory extending from its beginning to the time of the extinction of the large Pleistocene fauna, in particular, the horse, the camel, the mammoth, certain species of bison and others. While this terminal point is not always used, it will do for my definition. Operationally we may use as the terminal point the shift in subsistence patterns which accompanied the changing post-Pleistocene climate. The latter approach would give us a terminal date in the Far West ranging from 8,000 to 10,000 years ago, depending on the region. Much of my discussion will be concerned with the Early Man record.

I wish to point out that, as humanist as well as scientist, I view this record as the story of human beings, a part of the Human Epic. To this end I consider artifacts as the means to an end, never an end in themselves. The artifacts are the mute record of the men, women, and children who made and used them. Let us turn now to the record.

The question of the origins of the New World population is sometimes raised. Was the population indigenous or derived from another continent? Let us consider first the question of indigenous origin. Briefly, the answer is, that there was no ancestral primate stock in the New World corresponding to that in the Old which lead to the ape and human evolutionary

[1] I presented this paper in a slightly different form in the Science Seminar Series of the Joint Center for Graduate Study of Oregon State University, the University of Washington, and Washington State University at Richland, May 17, 1972. The Science Seminar Series is sponsored by Atlantic Richfield Hanford Company. No general bibliography is appended.

[2] D. W. Taylor. The Study of Pleistocene Nonmarine Mollusks in North America. In the Quaternary of the United States, a review volume for the VII Congress of the International Association for Quaternary Research. H. E. Wright, Jr. and David G. Frey (eds.). Princeton University Press, 1965, p. 597.

lines, both probably deriving from a common ancestral form in the lower Miocene Epoch or earlier in East Africa. The New World monkeys represent a more primitive and earlier stage of organization than the Old World variety. The evolutionary development runs from Old World monkeys into the Hominoidea which in turn branched into the great apes (Pongids) and Man (Hominids). The evolutionary history of the New World monkeys is obscure but at any rate the New World monkeys are not in the line of hominoid evolution. Sir Wilfred Le Gros Clark wrote:

> After the Eocene there were almost certainly no land-bridges between the Old and New Worlds which were favorable for the migration of animals adapted for life in tropical forests, and yet all the evidence at our disposal makes it reasonably certain that the early evolution of the Anthropoidea took place in such an environment.[3]

The indigenous origin of New World population can thus be ruled out.

The homeland of the first humans to move into the New World must, therefore, be sought elsewhere. All the evidence from physical anthropology, geology, and archaeology indicates that the source area was in northeastern Asia. It is not firmly established whether the area bordering on the Pacific coast or the interior, eastern Siberia, was the source. In the writer's present opinion the former is the more likely source for the earliest people, while later the Siberian people gradually merged into the movement and from time to time both sources contributed. The population movements were probably intermittent, on a small scale, and non-directional, except as guided by the search for food. The major problem now is the determination of the time of the earliest movements. The solution of the problem requires firm information from three sources: physical anthropology, geology, and archaeology.

These categories of evidence may be restated in these terms: 1) the availability of a relevant population reservoir or source in northeast Asia, 2) the evidence for land connection between the continents and the time at which they occurred, 3) firm evidence of human presence. The larger question really breaks down into two: first, when was intercontinental population passage *possible?* Notice the critical word "*possible*;" second, when did *intercontinental* population passage *actually* take place? Here the key word is *actually*. Information on the population reservoir and the land connections is relevant to the question of "possible" time; to answer the question of actual time firm information showing human presence must be added to these other two categories.

Further, for man to move into the continent from Alaska, a passage route was required. Alaska was isolated from the interior of the continent at various times by a mass of glacial ice 1,500 miles in width, stretching from coast to coast, and in places more than a mile thick; only the Yukon basin was ice-free, by comparison a Garden of Eden *cul-de-sac*. With deglaciation this ice barrier disappeared and the familiar Ice-Free Corridor became available to man. Glaciation, by lowering the sea level, made the land connection possible but it also closed the passage route to the continental interior; deglaciation submerged the land connection but opened the Ice-Free Corridor. Thus the problem of the arrival of man in the New World and his expansion into the interior depends on the configuration of these four specific categories of data: 1) an available population reservoir, 2) available land connection, 3) the presence of an Ice-Free Corridor, and 4) firm evidence of human presence. The logical structure of the problem is analogous to the structure of a non-circular plane figure in which the shape of the figure is determined by the location of a number of points, for example, a trapezoid or a rhomboid, etc. If the location of one point is changed the whole figure changes.

Let us now consider the substantive evidence; first the *biological factors:* The Asiatic population reservoir. This subject need not detain us long. Fossil remains, although few in

[3] Sir Wilfred E. Le Gros Clark, The Fourdations of Human Evolution, *Condon Lectures*, Oregon State System of Higher Education, Eugene, 1959, p. 32.

number, of *Homo sapiens*, apparently a proto-mongoloid stock, have been found widely scattered in China. These date from the third interglacial period well into the Wisconsin glaciation. These fossil human remains indicate the presence of a population pool or reservoir, probably small hunting and gathering groups some of whose descendants might have pushed on eventually across the land connection to North America. In other words, a population was available during the Upper Pleistocene, a period comprising well over 100,000 years, from which the New World population could have been derived. The evidence for man in the Lake Baikal region, and it is cultural, does not go beyond about 20,000 years ago. During the period of the land connection between 25,000 and 11,000 years ago there could have been groups derived from both northeastern China and Siberia contributing to the population movement; and in a vast area of land 1,000 miles in width, as the connection was, various population groups could have never met; and different cultural traditions could have existed contemporaneously known only to limited populations.

This source asiatic population, while having certain basic genetic traits in common, must have been highly diversified. It would probably have consisted of small nomadic predatory bands moving according to the availability of food. In this kind of human society the process of genetic drift is of the greatest importance in producing diversity. Hybridization is of limited importance. A small hunting band separating from a larger may carry only a portion of the total gene pool and that portion is what is carried on in the breeding population. In the vast areas of northeastern Asia there were undoubtedly many different minor gene pools contributing to the migrant population and it is these diverse sources which supplied the New World types. Genetic drift must have been a particularly important factor in producing further group differences between 25,000 and 11,000 years ago in the population south of the ice-sheet in the highly differentiated environment of Far Western North and Central America.

While the New World population would be expected to show similarities to the members of the source population reservoir, differences produced by genetic drift were added to by physical changes environmentally induced. Shapiro and others have demonstrated the effectiveness of the environment in influencing physical characteristics of a population although the exact methods are not fully understood.

No one should expect any New World group of 10,000 or more years ago to reproduce the physical likeness of some asiatic ancestral pool beyond a limited sharing of basic genetic traits, those comprising the hypothetical genotype of the proto-mongoloid population. Physical anthropologists find suggestive likeness in some cranial traits of New World skeletal remains dated on the order of 10,000 to 20,000 years ago and those of the Upper Pleistocene of China; but there are many differences. This is as it should be if the opinions expressed are valid, as I think they are.

The Geological evidence. Certain terms must be defined at this point and I shall use those proposed by the American Commission on Stratigraphic Nomenclature in 1961 and now in general use.

> (i) A glaciation was a climatic episode during which extensive glaciers developed, attained a maximum extent, and receded. (ii) An interglaciation was an episode during which the climate was incompatible with the wide extent of glaciers characterized by glaciation. (iii) A stade was a climatic episode within a glaciation during which a secondary advance of glaciers took place. (iv) An interstade was a climatic episode within a glaciation during which a secondary recession or a stillstand of glaciers took place (p. 660).

The formation of glaciers interrupted the normal cycle by which precipitation falling on the earth is returned to its source, the sea, for the falling rain and snow became a part of the frozen world of ice. As the volume of the ocean declined the shore line dropped with reference

to the land; in other words the sea level was lowered. This process which at its maximum reached a point of at least —100 meters and perhaps —130 meters, exposed land as islands in shallow areas, connected earlier separated land masses, and exposed along the coasts extensive new coastal plains where the continental shelf sloped gradually. Deglaciation reversed this process. This process of lowering and raising the sea level is called eustatic adjustment; Flint calls it "the swinging sea level."

The earth's crust under the ice and for some distance beyond its peripheries was depressed by the great weight of the ice and with the melting of the ice it returned to its former positions, a processes called isostatic adjustment. The depression in the vicinity of Vancouver, British Columbia, is estimated to have been as much as 1,000 feet; and beaches along the British Columbia coast high above the present shoreline reveal the upwarping of the earth's crust; and are of significance to the archaeologist working in the area.

The climatic episodes, glaciation and deglaciation, had effects of the greatest importance for the human occupation of the Great Basin, namely, the production and disappearance, in part or completely, of the vast system of pluvial lakes. These lakes were formed in fault-block depressions and depressed folds when the intake from precipitation exceeded the loss from evaporation; and when the process was reversed desiccation set in. In a general way the time of the pluvial lakes and their disappearance or shrinkage correlates with that of glaciation and deglaciation. Actually the evidence is clear that the correlation is only general and that the history of each lake must be studied in its own terms to place it in a reasonably accurate temporal position.

To relate this climatic and geological evidence to the problem of man's arrival in the New World requires firm information on the times when land connections existed. The question is more easily asked than answered. The general theory which relates the eustatic lowering of sea level with glaciation permits the deduction that a land connection should be relatively contemporaneous with a glaciation. If there were no other factors affecting the stability of a land mass, such as the Chukchi platform, the deduction would be valid, but tectonic changes have occurred. Recent studies have showed that while some formations are found on both sides of the Bering Strait others appear on only one shore. The further back in time, the more tenuous our information becomes. Hopkins has suggested that a land connection may have occurred even during an interglacial period. The record from paleontology makes it clear that during the Pleistocene there were land connections at various times and that Eurasiatic and North American faunas moved back and forth across them.

Since 1950, with the development of radiocarbon dating, a reasonably firm chronology has been developed for the late glacial episodes in the Pacific Northwest. Radiocarbon dates indicate that the Fraser Glaciation was underway with ice appearing in the northern end of the Strait of Georgia by 25,000 years ago and was in the Fraser Lowland by 24,500 years ago; the Puget lobe did not reach its maximum extent, about 15 miles south of Olympia, until about 15,000 years ago. At that time the ice in the area of present Seattle was 3,000 feet thick. Deglaciation progressed rapidly; present Lake Washington was ice-free by 13,500 and the Fraser Lowland by about 500 years later. Marine sediments and the presence of evidence of ice bergs in much of the Fraser Lowland show that the area, while ice-free, was unfit for human habitation. A final advance of the cordilleran ice sheet started about 11,000 years ago with a lobe moving down the Fraser canyon and occupying some 250 square miles of the upper lowland; the advance is called the Sumas Stade. Its termination date is uncertain, perhaps 10,500 years ago; but the canyon was free of ice by 9,000 years ago as shown by the archaeological remains at the site near Hope, apparently a salmon fishing location.

In the interior of British Columbia dating is much less firm. Three major sources of ice

were the Coast Mountains, fronting the open sea between the Queen Charlotte Islands and Vancouver Island, the Selkirk Mountains, and the Cariboo Mountains. The first provided the major source of ice both for the coast and the interior. It seems a reasonable position to take that, because of the non-maritime position of Interior British Columbia, its climate, and topography, that its glacial chronology is most likely to be contemporary with that of the major coastal area, that is, the Coast Mountains between the Fraser Lowland and southeastern Alaska.

The archaeologist, however, must keep in mind two important points which relate to the influence of glaciation and deglaciation on human prehistory. First, is the effect of these climatic episodes on the environment as human habitat. Second, is the nature of deglaciation. This affects not only the habitat potential, but the very nature of an ice-free corridor. Deglaciation apparently begins near the center of an ice-sheet, not at the periphery. Peripheral deglaciation is very uneven; some sections will be still advancing while others will be melting away or retreating. Ice sheets melt, but not evenly. Extensive blocks of ice may float in impounded melt waters. Vast wastage areas of bog land resulted in interior British Columbia and western Alberta from this process. How long a time was involved, time significant for human beings, for these wastage areas to become suitable for human habitat is unknown. Man is omnivorous and ubiquitous; he is certainly not amphibious.

I have presented this extended discussion of background information because I think it is necessary for any meaningful discussion of Early Man in the Far West. Without it the student is like a swimmer in a fog, completely unaware of where the safety of the shore line lies. There is no point in archaeologists pretending to a precision of knowledge when it is clearly lacking. The material I have presented represents our present state of knowledge; if it is true then a conclusion follows, if not true some other conclusion follows. Probably the best statement which summarizes this material and relates it to the archaeological problem is that of Hopkins. I quote:

> One can state only that an ice-free corridor must have existed there [Yukon Territory, northeastern British Columbia, and northern Alberta] during the mid-Wisconsin episode of mild climate that took place between 35,000 and 25,000 years ago; that waxing glaciation probably closed the corridor again earlier than 20,000 years ago; and that the corridor must have remained closed until at least 14,000 years ago and *possibly almost 10,000 years ago* (emphasis added; Hopkins (ed.), 1967, 467-8)[4]

The archaeological evidence. I shall present the archaeological data which are relevant to the time of the arrival of man in the New World, following Hopkins' model which I just presented. Conclusions will then be drawn. Available space requires me to be selective both with reference to the number of sites to be discussed and the amount of information presented. The most important data are, of course, the dates.

It is obvious that the age of sites should be progressively younger the further one is from the point of man's entry. The archaeological record does not conform to this model for a number of reasons. One is that if man had lived in an area later overridden by a glacial ice sheet there is little chance of any evidence surviving. Second, the amount of Pleistocene sediments in which human evidence should be found is limited. Finally, little archaeological search for sites in Pleistocene sediments has been made. Luck has played an important role in the discovery of sites which preserve evidence of Pleistocene man.

The archaeological evidence falls into two classes: 1) that from accepted valid sites and firmly dated; and 2) that from sites the validity of which is in dispute among archaeologists. Let us start with the first class, accepted sites, and for convenience move from north to south.

Lower Snake River and Middle Columbia River. The Marmes Rockshelter on the lower

[4] David M. Hopkins (ed.), The Bering Land Bridge, Stanford University Press, Stanford, 1958.

Palouse River, Granite Point and the Windust caves on the Snake, and Wildcat Canyon and the Five-Mile Rapids site at The Dalles on the Columbia River have records of occupation beginning at 10,000 to 10,500 and perhaps 11,000 radiocarbon years ago. This cultural manifestation is called the Windust Phase; it is thought to have been derived from the Northern Great Basin.

Wilson Butte Cave, in the Snake River Plain about 25 miles northeast of Twin Falls, Idaho, has produced two radiocarbon dates of more than 14,000 years ago. One is 15,000 and the other, 14,500. A long sequence of occupation follows. A single bone specimen, the identification of which as an artifact is equivocal, is associated with the older date. Stone artifacts are associated with the second date. The Pleistocene geologist, Haynes, has questioned the association of the artifacts with the dated strata as well as the use of burned bone as a satisfactory dating material. I have examined the bone specimen and think it is a tool, that is an artifact, because of what I interpret to be a wear or use facet at one end. I am not at all convinced that the excavator, Dr. Ruth Gruhn, is in error in her interpretation of the stratigraphic association.

Fort Rock Cave in south-central Oregon and a series of six rockshelters, all located on what were once islands, in Pluvial Fort Rock Lake, have provided a firmly documented record of occupation starting in Fort Rock Cave at 13,200 years ago. This date is from hearth charcoal and is associated with a cultural assemblage. The next date, from another shelter, is 11,950 radiocarbon years ago. This is followed by a series of dates from Fort Rock Cave and several shelters at the Connley Hills showing heavy use of the shelters. The only hiatus in the occupation of the caves is from 7,000 to 5,000 years ago when the lake bed was in the process of drying up and that condition was compounded by the catastrophic effects of the Mt. Mazama eruption. We know, however, that the country was not abandoned because the area within the lake bed, Table Rock, was used for an infant burial between 5,000 and 6,000 years ago. Since the Fort Rock Cave was occupied at 13,200 years ago when it first became available because of the lower lake level, we have to conclude that there was an available population outside the lake bed to supply the occupants for the cave.

Danger Cave in the Eastern Great Basin, just north of Wendover on the Utah-Nevada line has an initial date for human occupation of 11,151 radiocarbon years ago. Occupation of varying degrees of intensity continue until late times.

Fish Bone Cave on the eastern shoreline of Pluvial Lake Winnemucca, near Pyramid Lake, Nevada, has occupation dated at 11,000 years ago. A sandal, structurally similar to the Fort Rock Cave sandals but made from different material, is associated with this date.

Occupation occurs in the Fallon area of Nevada on the top terrace of Lake Lahontan but no material for radiocarbon dating has been found. By cross dating the artifacts with those from sites of known date in the Northern Great Basin and southeastern and southern California together with the probable date for the exposure of the Lahontan terrace, it is reasonable to fix a date for this material at about 10,000 years ago.

Ventana Cave in southwestern Arizona has a radiocarbon date of 11,300 years ago for the next to the lowest stratum in the cave which contains tenuous evidence of human occupation. Given the nature of the cave fill in these two lower strata it is not unreasonable to expect a date of something in the nature of 13,000 years ago for the earliest occupation of the cave.

The Tlapacoya Site on the shore of Pluvial Lake Chalco in the Valley of Mexico has dates from charcoal from two hearths at 24,000 radiocarbon years ago. A true blade is associated with this site.

Further south, the *Valsequillo Site* named for the gravels of that name and famous for the great numbers of fossil Pleistocene fauna found there, has a firm date of 25,000 years

ago, with a well developed stone working technology. A date of 35,000 or more years ago is in dispute.

Not all these sites are associated with an extinct Pleistocene fauna. That fact does not indicate that they post-date the extinction of those forms. The lack may be due to a number of causes: the local or micro-ecology, the chances of the hunt, butchering practices which did not provide large bones or teeth of the animals to be brought back to the occupation site, and sampling error in the excavations. Extinct animals which were hunted by these people were the jaguar, the horse, camel, bison, *Coragyps occidentalis* (the extinct Pleistocene vulture), the mammoth, and others. At both the Marmes Rock Shelter and The Dalles the bones of elk, larger than varieties now in the area, suggest a Pleistocene environment.

Let us now consider the significance of these dates before 10,000 years ago for the time of the arrival of man in the New World. Using Hopkins' model we have between 70,000 and 35,000 years ago probably a number of land connections; but how many and when is uncertain. Certainly there was one during the glacial period terminating at 35,000 years ago but none in the succeeding warm interval ending at 25,000 years ago. There would have been an ice-free passage into the interior of the continent during that warm interval. Between 25,000 and possibly 10,000 years ago a massive land connection had as its counterpart the enormous Cordilleran-Laurentide ice-sheet, 1,500 miles wide in the Pacific Northwest, blocking access to the interior.

The dates for the archaeological sites I have just given clearly show that man was south of the Cordilleran ice-sheet which closed passage between 25,000 and 10,000 years ago. If this is so, then entry to the continental interior must have been made before that ice-sheet formed, or during the warm interval of 35,000 to 25,000 years ago. Further, since there was no land bridge during that interval the crossing had to have been made not later than during the glacial interval which terminated at 35,000 years ago. The vast unglaciated Yukon drainage basin, an area of 250,000 square miles, with its rich food supply provided a *refugium* for man and other Pleistocene animals. We can appreciate the significance of this area if we relate it to known space. The total area of California and Oregon is 255,000 square miles and that of the total Columbia River drainage basin is 259,000. The Yukon area is about the same size as part of England, France, and part of Germany where so much of the development of the paleolithic cultures of western Europe took place during several hundred thousand years. It is my opinion that man entered the New World well before 35,000 years ago.

Let us consider briefly a number of sites which some archaeologists do not accept as firmly established evidence of human presence. I accept these sites as valid evidence both on the presence of internal data and the evidence from the firm sites which shows that the dates of the questioned manifestations are strictly within the pattern of probability.

The *Texas Street Site* in San Diego was discovered and reported by Carter, a geographer, while studying the Pleistocene formations in that area. He found in a fan on the south side of the canyon in which the present San Diego River flows a number of fire basins or hearths, as he identified them, and associated tools. At least he identified the objects as tools. A radiocarbon date from the charcoal indicated the age was more than 35,000 years, that is beyond the range of C-14 dating. Archaeologists dismissed Carter's claims both by ignoring and attacking them and him. The reasons were: 1) the date was obviously too old; 2) Carter was a geographer and it was presumptuous for him to act as an archaeologist; 3) even if there was true charcoal in the basins it could be accounted for by other than human action; 4) the objects identified as artifacts by Carter could have been produced by natural means. Archaeologists said, "Forget it."

Carl Hubbs of the Scripps Oceanographic Institution, a long time friend of Carter, who had been associated in an informal way with

Carter in his work, took me to the Texas Street site in May of 1965 for a personal inspection. While the precise original site could not be located because of construction, a similar situation was located close by. Hubbs found in an exposure a basin similar to those described by Carter and it contained evidence of what appeared to be charcoal. Hubbs later checked the material in the lab and found it to be true charcoal. I have excavated through buried forest fire debris, holes made by burned stumps with their distinctive pattern, hearths in the open, and hearths in house pits. The pattern of the basin shaped depression with its charcoal, now filled by slumped gravel and sand, and the true charcoal, when viewed in terms of my experience convinced me that the fire basin could be and most likely was what Carter thought it to be, that is a human artifact.

A few miles to the north of San Diego in the sea-cliff at the Scripps Estates are a number of fire basins, saucer shaped areas of burned clay with charcoal. The cliff is the remnant of the Pleistocene terrace fill, about 50 feet thick, resting on the Sangamon interglacial beach. It is thought to encompass the entire Wisconsin (probably 70,000 years of time). About one-third of the way down from the surface a basin has been dated at 21,500 radiocarbon years ago. Krieger examined this fire basin and found bits of shell and stone flakes in and around it, indicating human presence. Later another exposure of the same kind was found about two-thirds of the distance down to the interglacial beach; this was dated at more than 34,000 years ago. The correspondence of this date with that from the Texas Street site is informative.

Santa Rosa Island, one of the Channel Islands 31 miles off the Santa Barbara coast provides further evidence. During the maximum of the last glaciation the lowered sea-level caused the four islands to be joined into a single land mass; and perhaps to join the mainland, although this connection is open to question. During this period of lowered sea-level a broad coastal plain extended some five miles seaward. The remnant of this plain is called the Tecolote Member of the Santa Rosa Formation and, like its counterpart at the Scripps Estates, is thought to include the entire Wisconsin. If there was no connection with the mainland via the easternmost island the water gap would have been shallow and not more than two miles wide. The rising sea-level has eroded the Tecolote Member and it is now exposed in cliffs of varying height; and it is from an area of about two miles along the cliff that most of the evidence comes.

The most striking member of the fossil fauna on Santa Rosa Island is the dwarf or pygmy mammoth, which stood about four feet high. Remains of these mammoths have been found in pits often accompanied by evidence of fire and charcoal. Some pits contain parts of several disarticulated animals suggesting that they had been butchered elsewhere and the parts brought to the pits for cooking. The excavation of these sites was carried out as a paleontological project without the archaeologists' interest in the presence or absence of minute evidence of human presence, such as exists at the Scripps Estates. The presence of fire and the presence of disarticulated animals in the same pit first suggested to and then convinced Orr, the paleontologist, that he was dealing there with the evidence of human activity. Several radiocarbon dates ranging from around 20,000 to beyond the range of the C-14 method were secured. Orr's reports of the presence of humans and at the time suggested by the radiocarbon date were generally received by archaeologists with incredulity and treated in the same manner as they treated Carter's; and for the same reasons.

In 1960 Dr. Fay-Cooper Cole, former Head of the Department of Anthropology at the University of Chicago, but then retired and a trustee of the Museum of Natural History of Santa Barbara, in cooperation with Orr, curator of the Museum, arranged for a field conference of archaeologists and other scientists, to study the evidence on Santa Rosa. I had the good fortune to be a member of the field conference. When I went to this conference I was very

skeptical of the validity of the claims but when I left I was convinced that Orr's claims of man and dwarf mammoth association were sound.

The chronology may be illustrated by a series of C-14 dates from Survey Point. These dates are in general stratigraphic alignment. The youngest is from a site about 45 feet above the Tecolote Member and is greater than 25,000 years ago. I helped collect the charcoal for this dating sample. About 11 feet below this site charred mammoth bone was found in a pit and dated at 29,700 years ago. Below this location and about 2.5 meters above the base of the Tecolote is a fire area about 1 meter in diameter which has been dated at more than 37,000 years ago.

The striking thing about these last three areas is the similarity of the cultural evidence and the general conformity of the dates.

I wish to mention one more bit of evidence even though it comes from east of the Rocky Mountains in southwestern Alberta, but nearer the point of entry to the New World. On the east bank of Oldman River about 9 miles northeast of Taber a field party of the Geological Survey of Canada found some bones of a human infant. The significance of the discovery was not realized at the time, for it was only after the bones had been cleaned in the laboratory that they were recognized as human. As a result further study continued at the area and specimens of wood were found for dating the bones. The bones were found about 40 feet below the base of the Late Wisconsin till and in alluvium deposited by a slowly aggrading river. The ice sheet passed across this section of Alberta about 23,000 years ago and so the bones should be older than that; as a matter of fact much older for they were buried under 40 feet of alluvium. Two C-14 dates from wood apparently closely associated with the bones are more than 32,000 and more than 37,000 years ago. Stalker, the party chief, believes that the time of their deposition may be as much as 60,000 years ago. In this case the overriding glacier did not destroy the human evidence protected by the deep mantle of alluvium.

A few very brief observations on major cultural developments are in order. First, the archaeological record shows clearly that the development of sophisticated methods of working stone to produce a wide variety of tools and weapons occurred on this continent as an autochthonous evolution. The point of view which holds that the well developed methods of stone working were introduced at about 12,000 years ago by new comers is not sound.

Second, between 10,000 and 8,000 years ago each of the major areas had laid the foundations for its future cultural and social development. On Santa Rosa Island and the adjacent coast of southern California the exploitation of the rich resources of the sea and shoreline was under way by 10,000 years ago. In the Great Basin the changing climatic conditions becoming effective about 8,000 years ago produced a more arid environment and reduced the available food supply, forcing the people to exploit all available plant and animal resources. Subsistence became hardly more than marginal. The economy prevented the development of any social organization above the minimum for survival.

On the Columbia Plateau along the Middle Columbia and Lower Snake rivers by 9,000 and perhaps even more years ago, the salmon, so richly supplied by the Columbia, became the staple food in the economy, once methods of taking the fish were perfected. Of course to this were added various roots, bulbs, fruit, and game. The nature of the salmon runs and the fact that good fishing sites were not evenly distributed gave rise to a system of exogamous marriages, that is outside the village, which in turn provided a network of kin in different areas.[3] Thus a family without access to a good

[3] I am indebted to Mr. David L. Cole, Acting Director of the Museum of Natural History of the University of Oregon, for this observation passed on to me more than ten years ago. Mr. Cole carried out the extensive archaeological salvage work in the John Day Dam reservoir on the Columbia River. The similarity of housekeeping objects and diversity of projectile point types lead him to infer that women upon marriage left their parental families to join those of their husbands' and thus, eventually, a fairly common variety of housekeeping materials was spread throughout the area. Men on the other hand retained the local traditions of their group.

fishing site probably had relatives at some place or places to which it could go to share the fishing at a favorable location. Families came down-river to meet the salmon runs and followed them slowly up-river. It is quite likely that this system of cooperating and interdependent kin groups was a major, if not the major, factor in producing the pacific character of this society. Peaceful coexistence was the price to pay for this cooperative kin organization essential for the maintenance of the economy and life itself.

The Great Basin culture also was unwarlike, but for a different reason; at its marginal subsistence level it could not afford the luxury of warfare.

Third, two great population movements took place about 1,000 years ago but in different places. One started probably in British Columbia and the other at the southern tip of the Sierra Nevada Mountains. The first consisting of Athapascan speaking peoples, saw one group move out of the homeland eventually to arrive in northwestern California and southwestern Oregon; another group which departed somewhat later eventually arrived in the Southwest and comprise the Apachean-Navajo speakers.

The second group called Numic speaking peoples spread rapidly eastward across the Great Basin in three main elements starting from the southern end of the Sierra Nevada: the Southern Paiutes or Utes in the south, the Shoshones in the center, and the Northern Paiutes in the north. The Utes expanded to the western Plains and became horse riding Indians. The Shoshoneans extended their area across the Rocky Mountains to the plains and became the famous equestrian Comanche. The Northern Paiute never passed out of the Great Basin beyond perhaps a foothold in the southern Columbia Plateau. Each of these groups continued to occupy its Great Basin territory.

What motivation lay behind these expansionist movements? Is it of any significance that they occurred about the same time in human history? One is reminded of the great movements of the Germanic tribes which swept over the frontiers of Imperial Rome. Toynbee's "Challenge and Response" theory does not help us, for while we may recognize the "response" we are completely in the dark about the "challenge."

American archaeology has little room for the humanist's approach; it is presently too interested in the development of techniques which will hopefully permit it to be classed as one of the "hard nosed" sciences in the hierarchy of disciplines, an unattainable aim if it be the study of *human* prehistory. My approach has been largely the study of the sweep of major forces and the interaction of human beings with them. I would not want to leave the impression that I see man as the victim of these forces but his actions cannot be understood without reference to them. Early Man, like us, was a population with wide ranging intellect, feelings of love and compassion, hate and jealousy, appreciation of beautiful objects and the willingness to do sloppy work. Prehistory is the story of human beings like ourselves acting out the drama on a set of different stages. The archaeologist is not less a scientist for being at the same time a humanist; in terms of his field probably the better scientist.

We archaeologists have an extremely limited view of the life of the people whose artifacts we recover. We do not know their myths which validated their value systems nor the tales by which their imaginative life was given play in fantasy. We should not substitute our limited knowledge for their reality. That there was more to their lives than just the struggle to survive is shown by the care men lavished on weapons, women on basketry — the humblest of household goods — and the ceremonial objects which they made. I, as other archaeologists, have excavated weapons which could only have been given their elegant finish to delight the beholder. The artistry lavished by the maker did not increase the lethal capacity of the weapon. And I have dug from the dirt and filth of caves fragments of exquisite basketry which give pleasure because of the skill with which the originals were made and the elegance of

the decoration applied. Simple, woven, undecorated baskets would have served the housekeeping needs but these people went beyond that and added intricacy of fabrication and imaginative designs to give pleasure to the beholder.

Certainly on the perceptual world these people imposed for their safety and assurance, a world of imaginative fantasy which gave meaning to it. What these myths were no one will ever know but one can be sure that with their acceptance they provided an orderly world in which life was tolerable, even though the myths were fanciful. They must have learned early, as Shelley so eloquently writes "To look through thin and rainbow wings upon the shape of death." The shaman must many times have been far more important to both the individual and the social group than the hunter. These were human beings whose epic behavior provides our problem and its true dimensions become meaningful only if that salient fact is kept in mind.

If one wishes to grasp something of the full meaning of this human experience I have been discussing he must explore it imaginatively in terms of problems met and solved or unsolved, the experiences faced by men, women, and their children. The thousands of miles of often frightful landscape which were eventually crossed and even lived in are part of the scene. We talk of tundra, taiga, mountains, ice-free corridors, predators and the lack of them but the effects of these on the human experience escapes us or we avoid their consideration. This man-environment relation adds a proper dimension to this series of events of epic proportion. I can but suggest some of them. Fears of the known: the dire wolf, the sabre-tooth cat, the jaguar, and other predators; the fears of the unknown: the seemingly limitless bogs, dark forests, deserts, volcanic eruptions, ice fields, and even "that angry or that glimmering sea" were as much a part of their world as the understood objects giving rise to their fears. Hardships and genial environments are part of the picture. If we keep the human part of the problem in mind, the non-human aspects gain added significance.

Even then, at the best, perhaps our understanding will not transcend that of the poet who wrote:

> We are the Pilgrims, master: we shall go
> Always a little further: it may be
> Beyond that last blue mountain barred with snow,
> Across that angry or that glimmering sea.
>
> We travel not for trafficking alone:
> By hotter winds our fiery hearts are fanned:
> For lust of knowing what should not be known
> We make the golden journey to Samarkand.
>
> It was ever thus.
> Men are unwise and curiously planned.
>
> James Elroy Flecker:
> *The Golden Journey to Samarkand.*

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We archaeologists have an extremely limited view of the life of the people whose artifacts we recover. We do not know their myths which validated their value systems nor the tales by which their imaginative life was given play in fantasy. We should not substitute our limited knowledge for their reality. That there was more to their lives than just the struggle to survive is shown by the care men lavished on weapons, women on basketry, the humblest of household goods, and the ceremonial objects which they made. I, as other archaeologists, have excavated weapons which could only have been given their elegant finish to delight the beholder. The artistry lavished by the maker did not increase the lethal capacity of the weapon. And I have dug from the dirt and filth of caves fragments of exquisite basketry which gave pleasure because of the skill with which the originals were made and the decoration applied. Simple, woven, undecorated baskets